

Atty. Docket No. 006629 USA D 01/PDC/WF/OR (Q77224)
PATENT APPLICATION

AMENDMENT UNDER 37 C.F.R. § 1.111
U.S. Application No. 10/784,771

AMENDMENTS TO THE CLAIMS

This listing of claims will replace all prior versions and listings of claims in the application:

LISTING OF CLAIMS:

1-4. (*Canceled*)

5. (*Previously Presented*) An optical inspection system comprising:

a light source outputting an annular beam;

an objective lens focusing the annular beam at a target;

a detector receiving light scattered from the target, through the objective lens; and

wherein:

the detector receives the scattered light, as dark field detection, through a portion of the objective lens corresponding to an inner part of the annular beam; and

the detector simultaneously receives light reflected from the target, as bright field detection, through a portion of the objective lens corresponding to an outer part of the annular beam.

6. (*Currently Amended*) An optical inspection system comprising:

a light source outputting an annular beam;

an objective lens focusing the annular beam at a target;

a detector receiving light scattered from the target, through the objective lens;

Atty. Docket No. 006629 USA D 01/PDC/WF/OR (Q77224)
PATENT APPLICATION

AMENDMENT UNDER 37 C.F.R. § 1.111
U.S. Application No. 10/784,771

a scanner scanning the annular beam along a line in a given scanning direction to provide a scanned single annular beam; and

a multiple beam splitter producing multiple annular beams of substantially identical intensity from the scanned single annular beam; and,

wherein:

the detector receives the scattered light, as dark field detection, through a portion of the objective lens corresponding to an inner part of each of the annular beams; and

the detector simultaneously receives light reflected from the target, as bright field detection, through a portion of the objective lens corresponding to an outer part of each of the annular beams.

7. Canceled.

8. (Currently Amended) ~~The~~ An optical inspection system as set forth in claim 6, comprising:

a light source outputting an annular beam;

an objective lens focusing the annular beam at a target;

a detector receiving light scattered from the target, through the objective lens;

a scanner scanning the annular beam along a line in a given scanning direction to provide a scanned single annular beam; and

Atty. Docket No. 006629 USA D 01/PDC/WF/OR (Q77224)
PATENT APPLICATION

AMENDMENT UNDER 37 C.F.R. § 1.111
U.S. Application No. 10/784,771

a multiple beam splitter producing multiple annular beams of substantially identical intensity from the scanned single annular beam;

wherein the detector is a multiple line CCD camera, and wherein each of the multiple annular beams is imaged on a separate one of the lines of the multiple line CCD camera.

9. *(Currently Amended)* An optical inspection system, comprising:

a light source outputting a single beam;

a scanner scanning the single beam along a line in a given scanning direction to provide a scanned single beam; and

a multiple beam splitter producing multiple beams of substantially identical intensity from the scanned single beam; and

an objective lens focusing the multiple beams at a target; and

a detector receiving light returned from the target, through the objective lens;

wherein the detector includes a multiple line CCD camera, and wherein each of the multiple annular beams is received on a separate one of the lines of the multiple line CCD camera.

10. *(Original)* The optical inspection system as set forth in claim 9, wherein the multiple beam splitter produces the multiple beams with a diffractive optical element having uniform diffraction efficiency.

Atty. Docket No. 006629 USA D 01/PDC/WF/OR (Q77224)
PATENT APPLICATION

AMENDMENT UNDER 37 C.F.R. § 1.111
U.S. Application No. 10/784,771

11. (*Original*) The optical inspection system as set forth in claim 10, wherein the diffractive optical element is a Dammann grating.

12. Canceled.

13. (*Currently Amended*) An optical inspection system, comprising:
a light source outputting a beam; and
a scanner scanning the beam in a beam spot across a target, the target being movable in a target movement direction;
wherein the beam has a scanning direction not perpendicular to the target movement direction; and,

further comprising a beam splitter operating on said beam to produce at least one additional beam, wherein said scanner scans the additional beam in a direction not perpendicular to the target movement direction; and

wherein the beam splitter produces the additional beam with a diffractive optical element having uniform diffraction efficiency.

14. Canceled.

15. (*Currently Amended*) An optical inspection system, comprising:
a light source outputting a beam;
a beam splitter receiving the beam and producing therefrom a plurality of beams;
a scanner scanning the plurality of beams;

Atty. Docket No. 006629 USA D 01/PDC/WF/OR (Q77224)
PATENT APPLICATION

AMENDMENT UNDER 37 C.F.R. § 1.111
U.S. Application No. 10/784,771

a confocal optical arrangement comprising a pinhole; and
optics for focusing the plurality of beams at a target and directing captured light to a
detector through the confocal optical arrangement; and,

further comprising a bright field channel detector including a multiple line CCD camera
and wherein each of the plurality of beams is received on a separate one of the lines of the
multiple line CCD camera.

16. *(Currently Amended)* ~~The~~ An optical inspection system ~~as set forth in claim 15,~~
comprising:

a light source outputting a beam;

a beam splitter receiving the beam and producing therefrom a plurality of beams;

a scanner scanning the plurality of beams;

a confocal optical arrangement comprising a pinhole; and

optics for focusing the plurality of beams at a target and directing captured light to a
detector through the confocal optical arrangement; and,

further comprising a plurality of light detection elements, each corresponding to one of
said plurality of beams.

17. *(Canceled)*

18. *(Currently Amended)* An optical inspection system, comprising:

a light source providing a beam of light through a pupil;

a multiple beam splitter receiving the light through the pupil;

Atty. Docket No. 006629 USA D 01/PDC/WF/OR (Q77224)
PATENT APPLICATION

AMENDMENT UNDER 37 C.F.R. § 1.111
U.S. Application No. 10/784,771

a scanner receiving the multiple beams and providing scanned multiple beams;
a beam splitter receiving the scanned multiple beams and illuminating a target through an objective lens;

the objective lens collecting light returned back from the illuminated target and passing the collected light through the beam splitter to an imaging lens;

the imaging lens receiving the light passing through the beam splitter and focusing the light to a bright field channel detector;

wherein the bright field channel detector includes a multiple line CCD camera, and wherein each of the multiple beams is received on a separate one of the lines of the multiple line CCD camera;

a second beam splitter optically disposed between the imaging lens and the bright field channel detector; and

the light from the imaging lens deflected by the second beam splitter being focused on a dark field channel detector.

19. Canceled.

20. *(Currently Amended)* ~~The An~~ optical inspection system as set forth in claim 18, comprising:

a light source providing a beam of light through a pupil;

a multiple beam splitter receiving the light through the pupil;

Atty. Docket No. 006629 USA D 01/PDC/WF/OR (Q77224)
PATENT APPLICATION

AMENDMENT UNDER 37 C.F.R. § 1.111
U.S. Application No. 10/784,771

a scanner receiving the multiple beams and providing scanned multiple beams;
a beam splitter receiving the scanned multiple beams and illuminating a target through an
objective lens;
the objective lens collecting light returned back from the illuminated target and passing
the collected light through the beam splitter to an imaging lens;
the imaging lens receiving the light passing through the beam splitter and focusing the
light to a bright field channel detector; and,
an other beam splitter optically disposed between the imaging lens and the bright field
channel detector; and
the light from the imaging lens deflected by the other beam splitter being focused on a
dark field channel detector.

21. *(Original)* The optical inspection system as set forth in claim 20, wherein at least one of the bright field channel detector and the dark field channel detector includes a multiple line CCD camera, and wherein each of the multiple annular beams is received on a separate one of the lines of the multiple line CCD camera.

22. *(Currently Amended)* An optical inspection system, comprising:
a light source providing a beam of light;
a scanner receiving the light through a first beam splitter and providing scanned light;
a second beam splitter receiving the scanned light through a scan lens, and illuminating a target through an objective lens;

Atty. Docket No. 006629 USA D 01/PDC/WF/OR (Q77224)
PATENT APPLICATION

AMENDMENT UNDER 37 C.F.R. § 1.111
U.S. Application No. 10/784,771

the objective lens collecting light returned back from the illuminated target and passing the collected light to the second beam splitter;

the second beam splitter providing part of the collected light, as a returned light signal, back through the scan lens and scanner to the first beam splitter;

the first beam splitter deflecting the returned light signal through a focusing lens and a pinhole; and

one or more detectors receiving the light through the pinhole; and

wherein:

the light source provides the beam of light through a pupil;

a multiple beam splitter receives the light through the pupil;

the light received by the scanner includes multiple beams provided by the multiple beam splitter, and the light scanned by the scanner includes multiple scanned beams;

the second beam splitter provides part of the collected light through an imaging lens to a bright field channel detector.

23. Canceled.

24. (*Original*) The optical inspection system as set forth in claim 22 23, wherein the bright field channel detector includes a multiple line CCD camera, and wherein each of the multiple annular beams is received on a separate one of the lines of the multiple line CCD camera.

Atty. Docket No. 006629 USA D 01/PDC/WF/OR (Q77224)
PATENT APPLICATION

AMENDMENT UNDER 37 C.F.R. § 1.111
U.S. Application No. 10/784,771

25. *(Original)* The optical inspection system as set forth in claim 22 ~~23~~, further comprising:
- a third beam splitter optically disposed between the imaging lens and the bright field channel detector; and
- the light from the imaging lens passing through the third beam splitter being focused also on a dark field channel detector.
26. *(Original)* The optical inspection system as set forth in claim 25, wherein the multiple scanned beams are annular beams.
27. *(Original)* The optical inspection system as set forth in claim 25, wherein at least one of the bright field channel detector and the dark field channel detector includes a multiple line CCD camera, and wherein each of the multiple annular beams is received on a separate one of the lines of the multiple line CCD camera.
28. *(Original)* The optical inspection system as set forth in claim 22 ~~23~~, wherein the multiple beam splitter produces the multiple beams with a diffractive optical element having uniform diffraction efficiency.
29. *(Original)* The optical inspection system as set forth in claim 28, wherein the diffractive optical element is a Dammann grating.
30. *(Original)* The optical inspection system as set forth in claim 22, wherein:
- the target is movable in a target movement direction; and

Atty. Docket No. 006629 USA D 01/PDC/WF/OR (Q77224)

PATENT APPLICATION

AMENDMENT UNDER 37 C.F.R. § 1.111

U.S. Application No. 10/784,771

the scanner scans with a scanning direction not perpendicular to the target movement
direction.

31-59. (*Canceled*)